

**DETAILED ACTION*****Claim Rejections - 35 USC § 112***

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In re claim1 it recites “the lubricant passes from the annular lubricant groove to the vertical hole without reentering the forward leading groove” which is not described in the specification. Please also note that per applicant’s specification(page 5 starting line 16) after lubricating the connecting rod ,part of the lubricant will be discharged in to the hermetic container thus will be re-circulated via the forward leading groove.

***Claim Rejections - 35 USC § 103***

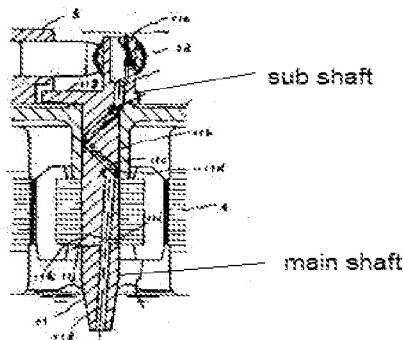
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

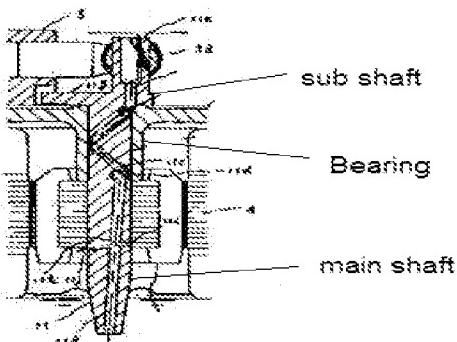
4. Claims 1- 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nobuo et al. (Japanese patent publication number S62-44108) in view of Goodnight (6457561) further in view of Choi (5971724) and Stocklein et al. (2996240).

5. In re claim 1, Nobuo et al. disclose lubrication system for hermetic compressor including:

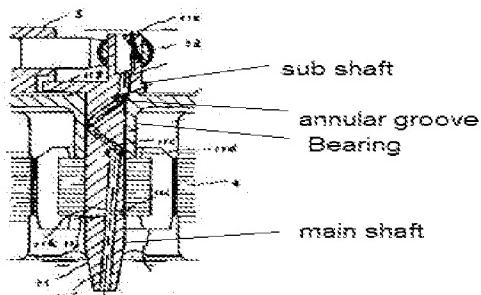
- **Electric compressor** ,in figure 1 and 2 ,comprising :a **single phase induction motor** (4) formed of stator and rotor
  - A **compressing mechanism** (5) driven by the **motor** (4)
  - A **hermetic container** (2) for accommodating the motor (4) and the compressing mechanism (2) and for pooling **lubricant** (7)
  - A shaft having a main shaft and sub shaft (shown below)



- A **cylinder (5)** for forming a compressing chamber
  - A bearing (shown below) for supporting the main shaft



- A **centrifugal pump (11)** opening into **the lubricant (7)**
- A **forward leading groove ( 11c)** engraved on an outer wall of the main shaft and having a first end communicating with the centrifugal pump (11a), and a **second end of the forward leading groove (11c)** opening to the annular lubricant groove.



- A **vertical hole (11f)** bored in the sub shaft and having a first end communicating with the annular lubricant groove and a second end opening into the hermetic container .Nobuo et al.,however fail to disclose the following limitation which is taught by Goodnight:

- Main shaft comprising a **first section (32)** having a first diameter and a **second section (46)** having a second diameter smaller than the first diameter; **reverse leading groove (44)** having a lead directing in an opposite direction to that of the **forward leading groove (42)**, and having a first end communicating with the **centrifugal pump (26)**, in **figure 7-9,14 and columns 3,line 39-50 and column 7,lines 7-11**.

However,Nobuo et al. in view of Goodnight fail to disclose the following limitation which is taught by Choi:

- **Leading groove (12)** having a first end within the second section of the shaft (i.e. the smaller diameter portion of the shaft),clearly shown in **figure 2 and 4**. Nobuo et al. in view of Goodnight and Choi fail to disclose the following limitation which is taught by Stocklein et al:
  - An **annular lubricant groove (b; figure 2)** having **an inner rim** and **an outer rim**;the **bearing (6)** defining in part the outer rim of the **annular lubricant groove (b; figure 2)**, wherein the **shaft (7)** includes a **circumferential notch (clearly shown in figure 2)** defining in part an **inner rim** of the **lubricant groove (b; figure 2)**, the **vertical hole (g)** communicating with the **outer rim** of the **annular lubricant groove (b; figure 2)**;wherein the **forward leading groove (15a)**,**annular lubricant groove (b; figure 2)** and the **vertical hole (g)** define a lubricant pathway such that the lubricant passes from the annular lubricant groove to the vertical hole without re-entering the forward leading groove.

6 . It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the compressor of Nobuo et al. by adding a reverse leading groove as taught Goodnight in order to ensure lubrication during reverse rotation of the compressor. Also since Nobuo et al. already disclosed forward leading groove having a first end communicating with the centrifugal pump and a second end communicating with an annular lubricant groove making the reverse leading groove second end communicating with an annular lubricant groove is a mere duplication. In addition It would have been obvious to one skilled in the art at the time the invention was made to locate the first end of the reverse leading edge in the smaller diameter section of the shaft as taught by Choi since the outer area of the smaller diameter section of the shaft serves as an oil accumulator which facilitates pumping action.

Please also note that Goodnight, in column 6,lines 17-20 teaches that the origin of the forward and reverse grooves can be at different locations and selecting the origin point would be obvious to one skilled in the art since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japikse*, 86 USPQ 70.Finally it would have been obvious to one skilled in the art at the time the invention was made to have modified the annular lubricant groove of Nobuo et al., Goodnight and choi by making it to have an inner rim and an outer rim since the area defined between the outer and inner rim serve as an oil buffer or reservoir for effective lubrication of the upper bearing area. Please note that once modified

the forward leading groove of Goodnight will directly be in communication with the area defined by the outer and inner rim of the annular lubricant groove.

7. In re claim 2 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

Goodnight discloses:

- The **reverse leading groove (44)** is formed at the intermediate section of the shaft, in **figure 6**.

8. In re claim 3 and 6 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

Goodnight discloses:

- Crossectional area of the reverse leading groove is smaller than that of the forward leading groove, in **column 7,lines 10-11 and line 35-38**.Please note that such choice of different areas would be an obvious design choice in order to vary the flow rate in the forward and reverse leading grooves.

9. In re claims 4,7 and 9 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

Goodnight discloses:

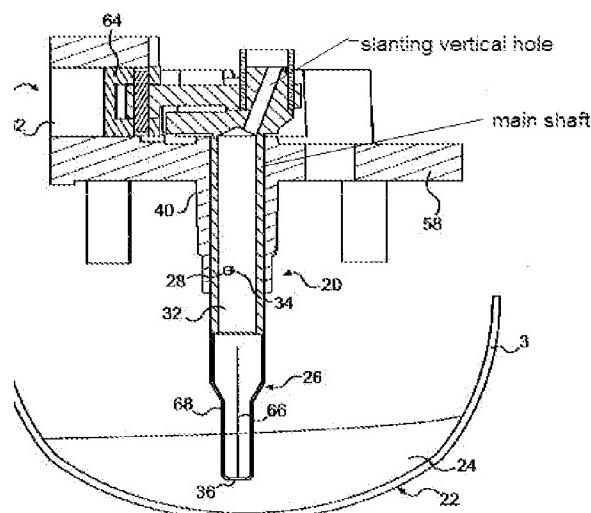
- Lead of the reverse leading groove is greater than that of the forward leading groove in **column 7,lines 10-11 and line 35-38**.Please note that the angle of the reverse (or forward) leading groove with respect to a plane perpendicular to an axis of the main shaft is interchangeable with the Lead. In addition it would have been obvious to

one skilled in the art at the time the invention was made to make the angle of the reverse leading groove to be larger than that of the forward groove simply because the lubricant oil has to go up the hill in the forward leading groove (thus it has to be small to ensure proper flow) while the lubricant oil is assisted by gravity in the reverse rotation and thus to utilize the gravity effect the groove should as much as possible be going close to 90 degree still making sure that the flow remains in the groove.

10. In re claim 5 Nobuo et al. in view of Goodnight further in view of Choi and Stocklein et al as applied to claim 1 disclose the claimed invention:

Goodnight discloses:

- A vertical hole slants with respect to a shaft center of the main shaft such that an upper section of the vertical hole slants outward ,in figure 2.



11. In re claim 8 Nobuo et al. in view of Goodnight further in view of Choi and

Stocklein et al as applied to claim 1 disclose the claimed invention:

Stocklein et al disclose:

- An entire rounding section of the upper end of the **bearing (6)** is chamfered (clearly shown in figure 2) and the annular lubricant groove is formed between the chamfered section and the main shaft (**7**).

***Response to Arguments***

12. Applicant's arguments with respect to claims 1 -9, filed on June 22,2010 are fully considered but are moot in view of the new ground of rejection necessitated by amendment.

***Conclusion***

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amene S. Bayou whose telephone number is 571-270-3214. The examiner can normally be reached on Monday-Thursday, 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on 571-272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/  
Supervisory Patent Examiner, Art  
Unit 3746

/Amene S Bayou/

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